

**REMARKS**

Claims 1-19 and 27-32 are canceled. Claims 20-26 and 33-42 are pending. Claim 38 has been withdrawn by the Examiner as being directed to non-elected subject matter. In the event of an allowance, Applicants respectfully request rejoinder of withdrawn claims.

By this amendment, claims 20, 24, 25, 33, 36, and 39 are amended, and new claims 40-42 are added. Support for the amendments can be found in the specification as filed, for example on page 2, lines 10-12. Support for new claim 40 can be found in the specification as originally filed, particularly page 3, lines 21-38 and Example 8, pages 28-29. Support for new claim 41 can be found in the specification as originally filed, particularly page 4, lines 13-30, and in claim 28, which was inadvertently canceled during the previous response. Support for new claim 42 can be found in canceled claim 29.

**Attorney Docket Number**

Please change the docket number from "BB-1264" to "2119-4272 (BB-1264)".

**Drawings**

Applicants thank the Examiner for the indication that the drawings are accepted for examination.

**Specification**

The specification is objected to for containing embedded hyperlinks, for example on page 8 (Office Action, page 2). However, by the *Preliminary Amendment and Response to Restriction Requirement*, submitted November 20, 2003, the specification was amended to

remove embedded hyperlinks. Applicants respectfully request clarification as to whether the preliminary amendment was entered, and if so, if there are any remaining hyperlinks.

### **35 U.S.C. 112, Second Paragraph**

Claims 20, 33, 36, and claims 21-26 and 34-37 which depend therefrom are rejected under 35 U.S.C. 112, second paragraph, due to the phrase “desaturase polypeptide” (Office Action, page 3). Applicants respectfully traverse. However, in order to advance prosecution, the claims are amended to insert the term “sphingolipid”. Applicants believe that the claims as amended distinctly claim the subject matter which applicants regard as the invention.

Claim 29 is rejected for depending from a canceled claim. By amendment, claim 29 is canceled in favor of new claim 42, which depends from claim 41.

### **New Matter**

Claim 39 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement as a “new matter” rejection. The Examiner argues that “perusal of the specification including example 8 did not provide support for the above method,” (Office Action, page 4). Applicants respectfully traverse.

Insertion of *Picramnia* cDNA into an expression vector is described on page 28, lines 6-14. Transformation using particle gun bombardment is described on page 28, lines 27-31. Analysis and determination of the presence of gamma-linolenic acid is described on page 29, lines 16-26. Regeneration of plants from transgenic callus is described on page 23, lines 34-37.

Applicants respectfully request withdrawal of the rejection.

**Scope of Enablement**

Claims 20-26 and 34-37 are rejected under 35 U.S.C. 112, first paragraph, for scope of enablement. The Examiner argues that the specification does not provide enablement “for any such polynucleotides encoding amino acid sequences that are 80%, 85%, 90% or 95% identical to SEQ ID NO:2, 4, 6, 8, and 17 and having delta-6-desaturase activity including vectors, host cells and method of making said polypeptides,” (Office Action, page 4). Applicants respectfully traverse.

It is noted that the polynucleotides of the invention encode polypeptides that belong to a cytochrome b5 superfamily and function as stereo-unselective sphingolipid desaturases. The enclosed Appendix A, shows these motifs marked in the alignment shown as Figure 1 of the Specification as filed. Appendix A shows an alignment of the amino acids corresponding to SEQ ID NO:2 (SIN\_2), SEQ ID NO:8 (SIN\_8), the borage delta 6 desaturase (gi\_2062403), SEQ ID NO:4 (SIN\_4), SEQ ID NO:10 (SIN\_10), the wheat polypeptide similar to borage delta 6 desaturase (gi\_4104056), SEQ ID NO:6 (SIN\_6), and sunflower delta 8 sphingolipid desaturase (gi\_1040729). The amino acids conserved among all the sequences are indicated by an asterisk (\*) above the alignment, the conserved amino acids present in the cytochrome b5 motif are underlined, and the three histidine motifs characteristic of desaturases are boxed. This alignment shows that the motifs mentioned above are present in the polypeptides having the amino acid sequences shown in SEQ ID NOs:2, 4, and 8 and that these motifs are surrounded by amino acids conserved among all the sequences.

Table 5, page 21, of the Specification as filed shows that the polynucleotides having the amino acid sequences shown in SEQ ID NOs:2, 4, and 8, are between 51.3 and 79.7% identical to the borage, wheat, and sunflower desaturases. Table A, below, shows the percent identity

between the amino acid sequences shown in SEQ ID NOs:2, 4, and 8 and the borage, wheat, and sunflower desaturases. The amino acid sequences having SEQ ID NOs:2, 4, and 8 are between 49.1 and 57.8% identical to each other.

Table A  
Percent Identity of Desaturases

	SIN02	SIN04	SIN08	2062403	4104056	1040729
SIN02	***	49.1	54.7	54.0	49.3	51.6
SIN04	49.1	***	57.8	54.0	79.7	53.7
SIN08	54.7	57.8	***	62.7	55.3	70.4
2062403	54.0	54.0	62.7	***	54.0	61.4
4104056	49.3	79.7	55.3	54.0	***	53.5
1040729	51.6	53.7	70.4	61.4	53.5	***

Thus, significant guidance is provided to the skilled artisan with respect to which amino acids are tolerant of modification, and which are conserved (i.e. expectedly intolerant to modification). Therefore, the specification meets the A-D requirements as outlined by the Examiner on page 6 of the Office Action, such that the specification as filed enables polynucleotides encoding polypeptides that are less than 100% identical to those shown in SEQ ID NOs:2, 4, and 8. Withdrawal of the 35 U.S.C. § 112, first paragraph rejection is kindly requested.

**CONCLUSION**

Based on the foregoing amendments and remarks, Applicants respectfully request reconsideration and withdrawal of the rejection of claims and allowance of this application.

**AUTHORIZATION**

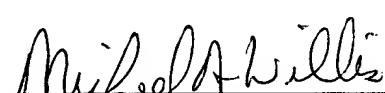
The Commissioner is hereby authorized to charge any additional fees which may be required for consideration of this Amendment to Deposit Account No. 13-4500, Order No. 2119-4272. A DUPLICATE OF THIS DOCUMENT IS ATTACHED.

In the event that an extension of time is required, or which may be required in addition to that requested in a petition for an extension of time, the Commissioner is requested to grant a petition for that extension of time which is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to Deposit Account No. 13-4500, Order No. 2119-4272. A DUPLICATE OF THIS DOCUMENT IS ATTACHED.

Respectfully submitted,  
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Dated: August 17, 2004

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APPENDIX A (page 1 of 3)

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bitterbush [SIN-2]  
soybean [SIN-8]  
borage [gi_2062403]  
corn [SIN-4]  
wheat_ [SIN-10]  
wheat_ [gi_4104056]  
soybean [SIN-6]  
sunflower [gi_1040729]
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bitterbush [SIN\_2]  
soybean [SIN\_8]  
borage [gi\_2062403]  
corn [SIN\_4]  
wheat [SIN\_10]  
wheat [gi\_4104056]  
soybean [SIN\_6]  
sunflower [gi\_1040729]

SEFSKMGLEFKTPGKGVYCSIFFVSVLFALSEVGVLYCKSTWAHLCSGLLMGMLWLQSGWV  
SEFSKLGLFDTKGHVTSCTLASVAMFLIVLVGVLRCTSVWAHLGSGMLLGLLWMMQSAYV  
FEFSKMGLYDKKGHIMFATLCFIAMLFAMSVYGVLFCEGVLVHLESGCLMGFLWIQSGWI  
AQLSSAGLFERVGTPKVQLVLMAVLFYAAALYLVLAACASAWAHLLAGGLIGFVWVQSGWM  
AQLSSAGLFERVGHTPKFLLVAMSVLFCIALYCVLACSSSTGAHMFAGGGLIGFIWVQSGWI  
AQLSSAGLFERVGHTPKFLLVAMSVLFCIALYCVLACSSSTGAHMFAGGGLIGFIWVQSGWI  
SDLSSAINLFRKGHTTSILLSLILTFPLSVCGVLFSDSTFVHVLSSAALIGFLWVQSGWI  
SEFAKAGMFEKKGHGVIYSLCFVSSLSSACVYGVLYSGSFVWIHMLSGAIIGLAWMQIAYL

**APPENDIX A (page 2 of 3)**

bitterbush_[SIN_2]	G HDSCH YQVMNRKLNRLFQIIAGNVIAGVSVAWWKLDAISPKEFNSLTSYYHNCMTYDRAAREFFVSEQHWTYPALLSVRVLYLILSFKVVFSNN	HNTHH FACNSANLDPPDIQHLP
soybean_[SIN_8]	G HDSGH YVVMTTNGFNKVAQILSGNCNLTGISIAWWKWT	HNAHH IACNSLDHDPDLQHMPV
borage_[gi_2062403]	G HDAGH YMVVSDSLNRNKFMGIFAANCLSGISIGWWKWN	HNAHH IACNSLEYDPDLQYIIPF
corn_[SIN_4]	G HDSGH HRITGHPVLDRVVQVLSGNCNLTGILSIAWWKCN	HNTHH IACNSLDHDPDLQHMP
wheat_[SIN_10]	G HDSGH HQITRHPALNRLLQVVSQNCNLTGILGIAWWKFN	HNTHH ISCNSLDHDPDLQHLP
wheat_[gi_4104056]	G HDSGH HQITRHPALNRLLQVVSQNCNLTGILGIAWWKFN	HNTHH ISCNSLDHDPDLQHLP
soybean_[SIN_6]	G HDSGH YNVMLSRRRNRAIQILSGNILAGISIGWWKWN	HNAHH IACNSLDYDPDLQHMPV
sunflower_[gi_1040729]	G HDAGH YQMMATRGWNKFAGIFIGNCITGISIAWWKWT	HNAHH IACNSLDYDPDLQHLP
* * * * *		
bitterbush_[SIN_2]	IAISPKEFNSLTSYYHNCMTYDRAAREFFVSEQHWTYPALLSVRVLYLILSFKVVFSNN	
soybean_[SIN_8]	FAVSSRFENSITSHFYGRKLEFDFIARFLICYQHETFYPMVCVARVNLYLQTILLFSR-	
borage_[gi_2062403]	LVSSSKFEGSLTSHFYEKRLTFDLSRFFVSYQHWTYPIMCAARLNMYVQSLIMLTK-	
corn_[SIN_4]	FAVSPPKLFGNINIWSYFYQRTLAFDAASKFFISYQHWTYPVMCIARINLLAQSAFLVLT-	
wheat_[SIN_10]	FAVSTKLFNNLWSVCYERTLAFDAISKFFVSYQHWTYPVMGFARINLLVQSIVFLITO-	
wheat_[gi_4104056]	FAVSTKLFNNLWSVCYERTLAFDAISKFFVSYQHWTYPVMGFARINLLVQSIVFLITO-	
soybean_[SIN_6]	FAVSSRFENSITSHXYGRKXEFDXIAXFLICYQHFTFYPMVCVARVNLYLQTILLFSR-	
sunflower_[gi_1040729]	IAVSSKLFENSITSVFYGRQLTDFPLAREFFVSYQHYLYYPIMCVARVNLYLQTILLISK-	
* * * * *		
bitterbush_[SIN_2]	KRVYKRSQEILGYAAFLTWYSLLSRLPNWPERVMYFTSCLAVAGFQHWQFSLNHFAASNV	
soybean_[SIN_8]	RKVQDRALNIMGILVFWTIWFPLLVSCLPNWPERRMFLVLAFAVCSIQHIFQCLNHF	
borage_[gi_2062403]	RNVSYRAHELLGCLVFSIWWYPLLVSCLPNWERGERIMFVIASLSVTGMQQYQFSLNHF	
corn_[SIN_4]	KRVPQRLLIEIAGVATFWAWYPLLVASLPNWWERVAFLVFSFTICGIQHVFCLNHF	
wheat_[SIN_10]	KKVRQRWLEIAGVAAFWWWYPLLVSCLPNWWERVAFLVFSFTICGIQHVFCLNHF	
wheat_[gi_4104056]	KKVRQRWLEIAGVAAFWWWYPLLVSCLPNWWERVAFLVFSFTICGIQHVFCLNHF	
soybean_[SIN_6]	XKVQDRALNIMGILVFWTWFLLFLA-----LLFV-----PIQHIFQFWLNHLAENL	
sunflower_[gi_1040729]	RKIPDRGLNILGTLIIFWTFPLLVSCLPNWPERRAFLVFSFTICGIQHIFQFTLNHFSGDV	

APPENDIX A (page 3 of 3)

bitterbush [SIN_2]	YTGJLPSGNDFWFHQQTKGTLNITASAWWDWFHGGLHF	QIEHH	LFPRMPKCHFRKISPIVNK
soybean [SIN_8]	YVGPPSGNDWFEEKQQTSGTLDISCASSMDWFHGGLQF	QLEHH	LFPRPLPRCQLRKISPLVSD
borage [gi_2062403]	YVGPKGNNDWFEEKQQTSGTLDISCASSMDWFHGGLQF	QIEHH	LFPRMPRCNLRKISPLVSD
corn [SIN_4]	YVGPPKGNDWFEEKQQTAGTLDILCSPWMDWFHGGLQF	QIEHH	LFPRPLPRCQLRKISPLVSD
wheat [SIN_10]	YVGPPKGNDWFEEKQQTAGTLDILCSPWMDWFHGGLQF	QIEHH	LFPRPLPRCQLRKISPLVSD
wheat [gi_4104056]	YVGPPKGNDWFEEKQQTAGTLDIKCSPWMDWFHGGLQF	QIEHH	LFPRPLPRCQLRKISPLVSD
soybean [SIN_6]	YVGPPKGNDWFEEKQQTAGTLDIKCSPWMDWFHGGLQF	QIEHH	LFPRPLPRCQLRKISPLVSD
sunflower [gi_1040729]	YVGPPKGNDWFEEKQTRGTIDIACSSWMDWFHGGLQF	QLEHH	LFPRPLPRCQLRKISPLVSD
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bitterbush [SIN_2]	LCQKHNLSYETATMWEANKMVYSTLRAVAMEAKDVTK-PVPKNMVWEAMNTFG		
soybean [SIN_8]	LCKKHNLPYRSLSWEANQWTIRTLRTAALQARDLTN-PAPKNLWEAVNTHG		
borage [gi_2062403]	LCKKHNLPYRSLSWEANQWTIRTLRTAALQARDLTN-PAPKNLWEAVNTHG		
corn [SIN_4]	LCKKHGLTYSAAUTGANVLTWKTLRAAALQARTATSGAPKNLWEAVNTHG		
wheat [SIN_10]	LCKKHGLTYSAAUTGANVLTWKTLRAAALQARTATSGAPKNLWEAVNTHG		
wheat [gi_4104056]	LCKKHGLTYSAAUTGANVLTWKTLRAAALQARTATSGAPKNLWEAVNTHG		
soybean [SIN_6]	LCKKHGLTYSAAUTGANVLTWKTLRAAALQARTATSGAPKNLWEAVNTHG		
sunflower [gi_1040729]	LCKKHGLTYSAAUTGANVLTWKTLRAAALQARTATSGAPKNLWEAVNTHG		